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The Mineral Industry of the German Democratic Republic

UNITED STATES DEPARTMENT OF THE INTERIOR

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The Mineral Industry of the German Democratic Republic

By George A. Rabchevsky[1]

The German Democratic Republic (GDR) was the most industrially advanced of the Council for Mutual Economic Assistance (CMEA) countries.[2] In 1987, the planned produced national income increase of 4.5% rose only 3% during midyear, and 4% at yearend, to about $143 billion.[3] The growth was about the same as in 1986 and was attributed mostly to the industrial sector. Because of the less-than-ideal economic performance, the Secretary-General, in his annual speech to the first secretaries of district organizations on February 12, criticized some sectors of the economy. He reportedly said that industry was plagued by unnecessary shutdowns, slowdowns caused by accidents, and poor labor discipline. Factories often stood idle because of poor planning and an inadequate infrastructure.[4] Nevertheless, the GDR continued to have a high standard of living, and the economic expansion was above average for CMEA countries. In the mining industry sector, the 1987 plan fulfillment statistics listed only coal and potash as significant commodities, combining all other industrial minerals, metals, and mineral fuels into broad categories.[5] The processing of metals and the recycling of scrap materials also contributed somewhat to the general economy. The general industry contributed about 80% to the produced national income, of which the metals, minerals, and mining industry was a significant component. In 1986, according to the latest official statistics, the energy and fuel sector contributed 7.6% to overall industrial production, metallurgy 9.4%, and the chemical industry (including fertilizers) 20.3%. Heavy industry employed 37.7% of the total work force, which included 226,330 workers from the energy and fuel industry, 138,086 from metallurgy, and 339,463 from the chemical industry. There were a total of 3,449 industrial enterprises, of which 241 were in the chemical, 49 in the energy, and 42 in the metallurgical sectors.[6]

The GDR had a well-established infrastructure and transportation network for the receipt and distribution of its raw materials. In 1986, coal and coke accounted for the largest volume of commodities transported by rail at 33.8%, followed by building materials, 23.2%; ores and metals, 9.8%; chemical products, 7.5%; and oil and oil products, 6%. Except for building materials and agricultural products, coal and coke accounted for the largest volume of commodities transported by inland waterways at 12.3% and by overland routes, 2.4%, followed by ores and metals, 7.7% and 1.1%, respectively. Reportedly, no oil or oil products were transported over public highways. A total of 25.51 million tons of cargo was handled at seaports, of which ores and metals constituted the largest category at 8.05 million tons, followed by fertilizers, 4.33 million tons; oil and oil products, 3.42 million tons; and coke and coal, 1.49 million tons. The port at Rostock handled 80% of the cargo.

PRODUCTION

The GDR's labor productivity in the national economy increased by 4%. In industry, net production reportedly rose by 6.3% and labor by 6.6%. The production of indus-

trial goods rose by 3.7% at reduced material and operating costs. In minerals production, the output remained about the same as in 1986. Production of some commodities decreased according to plan, while others were overproduced. The production of brown coal was below the 1986 level, and according to the plan fulfillment results, members of the armed forces helped in coal production operations.[7]

The collection and use of secondary raw materials and scrap continued to increase, amounting to 31 million tons in 1987. Of this, 5.5 million tons was collected as metal scrap, together with 1.3 billion bottles and other pieces of glass. The share of secondary materials in the production of raw steel and copper was 68% each and 100% for the production of lead. A total of $41.2 billion was reportedly spent for the modernization, renovation, or expansion of existing industrial production facilities, or 6% more than in 1986. This included the introduction of new processing technologies, such as electron beam and laser processing methods for cutting, welding, and materials heat treatment. Production began of grinding tools made of synthetic superhard cutting materials, of new refractory products for converter steel production, ladle metallurgy, powder-metallurgical materials, and ceramic materials. The number of industrial robots rose to 78,800, resulting in an 8% increase of products. The streamlining contributed to the savings in the utilization of energy, steel, and nonferrous stocks.

Table 1.—German Democratic Republic: Production of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity[2]	1983	1984	1985	1986[p]	1987[e]
METALS					
Aluminum:					
Alumina:					
For metallurgical use	42,156	43,239	46,695	46,350	46,500
For other use[e]	20,000	20,000	20,000	20,000	20,000
Metal:[e]					
Primary	57,000	58,000	60,000	r65,000	68,300
Secondary	52,000	52,000	52,000	52,000	52,000
Total	109,000	110,000	112,000	r117,000	120,300
Cadmium metal, primary[e]	15	15	15	r18	18
Copper:					
Mine output, Cu content[e]	12,000	12,000	12,000	10,000	9,000
Metal:					
Smelter, primary	17,000	14,000	14,000	12,000	12,000
Refined:[e]					
Primary	35,000	35,000	35,000	35,000	30,000
Secondary	r33,000	30,000	28,000	28,000	28,000
Total	68,000	65,000	63,000	63,000	58,000
Iron and steel:					
Iron ore and concentrate thousand tons	40	36	30	...	...
Fe content do	20	20	15	...	...
Metal:					
Pig iron do	2,207	2,357	2,578	2,738	2,900
Ferroalloys, electric furnace do	128	124	124	135	135
Steel, crude do	7,219	7,573	7,853	7,967	8,200
Semimanufactures (hot-rolled only) do	5,084	5,386	5,637	5,656	5,800
Lead:[e]					
Smelter, primary	20,000	22,000	20,000	20,000	18,000
Refined, all sources	36,000	35,000	55,000	r46,000	45,000
Nickel:					
Mine output, Ni content, recoverable	2,200	2,000	2,000	2,000	2,000
Metal, refined[e]	3,000	3,000	3,000	r3,200	3,200
Silver, mine output, Ag content, recoverable thousand troy ounces	1,380	1,290	1,320	1,320	1,200
Tin:[e]					
Mine output, Sn content, recoverable	1,800	2,500	2,800	2,800	2,500
Metal, smelter output including secondary	2,000	3,000	3,300	3,000	2,500
Zinc metal including secondary	16,500	17,000	17,000	17,000	19,000
INDUSTRIAL MINERALS					
Barite[e]	35,000	35,000	34,000	34,000	32,000
Boron materials: Processed borax, $Na_2B_4O_7 \cdot 10H_2O$ content[e]	4,000	4,000	4,000	4,000	4,000
Cement, hydraulic thousand tons	11,782	11,555	11,608	11,988	11,500

See footnotes at end of table.

Table 1.—German Democratic Republic: Production of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity[2]	1983	1984	1985	1986[p]	1987[e]
INDUSTRIAL MINERALS —Continued					
Chalk[e] thousand tons	40	40	40	40	40
Clays, kaolin:[e]					
Crude do.	400	350	350	330	320
Marketable do.	200	175	175	165	150
Fluorspar[e] do.	100	100	100	100	90
Gypsum and anhydrite:					
Crude[e] do.	360	360	360	340	340
Calcined do.	297	302	312	305	310
Lime and dead-burned dolomite do.	3,458	3,597	3,567	3,545	3,525
Nitrogen: N content of ammonia do.	1,206	1,203	1,206	1,193	1,315
Potash, marketable, K_2O equivalent do.	3,431	3,465	3,465	3,485	3,500
Pyrite, gross weight[e] do.	20				
Salt:					
Marine do.	56	58	58	59	58
Rock do.	3,070	3,075	3,080	3,075	3,075
Total do.	3,126	3,133	3,138	3,134	3,133
Sodium compounds, n.e.s.:					
Caustic soda do.	687	694	667	638	615
Sodium carbonate do.	887	890	884	885	887
Sodium sulfate do.	152	164	172	181	188
Stone, sand and gravel:					
Crushed stone[e] do.	16,000	14,500	15,000	15,000	14,500
Sand and gravel do.	8,628	8,509	8,437	8,163	7,985
Sulfur:					
Byproduct:[e]					
Elemental do.	90	80	80	75	75
Other forms do.	270	270	250	240	240
Sulfuric acid do.	926	885	883	883	870
MINERAL FUELS AND RELATED MATERIALS					
Coal, brown coal (lignite) do.	277,968	296,341	312,000	311,260	309,000
Coke:					
From anthracite and bituminous coal[e] do.	1,200	1,150			
From brown coal:					
High-temperature do.	2,510	2,463	2,497	2,509	2,515
Low-temperature do.	3,210	3,327	3,185	3,092	3,010
Total do.	6,920	6,940	5,682	5,601	5,525
Fuel briquets (from lignite) do.	50,047	50,270	50,666	51,434	49,500
Gas:					
Manufactured million cubic feet	255,320	272,695	274,743	281,029	286,000
Natural, marketed production[e] do.	353,000	459,000	459,000	459,000	459,100
Petroleum:					
Crude thousand 42-gallon barrels	383	430	[r]430	[r]360	360
Refinery products:					
Gasoline do.	33,618	35,190	36,567	36,792	39,000
Kerosene, jet fuel, distillate fuel oil do.	46,915	47,525	49,216	49,013	49,000
Residual fuel oil do.	56,610	59,940	[r]60,000	[r]60,000	65,000
Lubricants do.	3,258	3,231	3,346	3,317	3,300
Total[3] do.	140,381	145,886	149,129	149,122	156,300

[e]Estimated. [p]Preliminary. [r]Revised.

[1]Table includes data available through May 1988.

[2]In addition to the commodities listed, magnesium, peat, and a variety of construction materials are produced, but output is not reported, and available information is inadequate to make reliable estimates of output levels.

[3]Total of listed products only.

TRADE

The GDR relied heavily on foreign trade for its economic well-being, especially in the supply of raw materials. Primary foreign trade of the GDR was with CMEA countries and the neighboring Federal Republic of Germany (FRG). According to the 1987 plan results, the GDR's foreign trade turnover was more than $96 billion, 40% of which was with the U.S.S.R., its largest trading partner. An export surplus of $1.8 billion was reported in 1987. About 50% of the GDR's exports to the U.S.S.R. were specialized products, 70% of which were designated for the metalworking industry. The Soviet Union continued to supply raw materials to the GDR, thus replacing its diminishing indigenous minerals base and ensuring a steady supply of those materials to the national economy. The Soviet Union, virtually the sole supplier, reportedly delivered about 123 million barrels of oil, 247 million cubic feet of natural gas, and 3.3 million tons of rolled steel. Deliveries of gas and iron and steel increased sharply in 1987. From 50% to 70% of other mineral and metal commodities were imported from various other countries. Future development was based on continued and expanded ties with other countries, primarily because of lack of indigenous raw materials and improving the standard of living. This included some trade with the United States and renewed contacts with China, with which relations were broken off in the early 1960's. A trade protocol was signed also with Albania, under which the GDR would import chrome ore, copper wire, and various metallurgical products, in addition to other nonmineral commodities.

Table 2.—German Democratic Republic: Apparent exports of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1985	1986[P, 2]	Destinations, 1986: United States	Destinations, 1986: Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkaline-earth metals	323			
Aluminum:				
Oxides and hydroxides		4		Finland 3; France 1.
Ash and residue containing aluminum	2,425	1,437		Netherlands 1,174; Belgium-Luxembourg 157; Spain 106.
Metal including alloys:				
Scrap	6,133	4,496		Netherlands 2,543; Belgium-Luxembourg 659; France 566.
Unwrought	25,007	7,630		Poland 5,019; Japan 2,003; United Kingdom 204.
Semimanufactures	22,343	7,373	19	Hungary 2,146; Sweden 1,850; Finland 704.
Cadmium: Metal including alloys, all forms	55			
Copper:				
Ore and concentrate	3,267			
Matte and speiss including cement copper	300	946		All to France.
Sulfate	18	8,707		Sweden 8,697; Greece 10.
Metal including alloys:				
Scrap	460	25		All to Belgium-Luxembourg.
Unwrought	11,202	6,769	7	Netherlands 3,607; France 2,072; Austria 791.
Semimanufactures	48,390	3,907	85	Austria 865; Hong Kong 837; Switzerland 664.
Gold: Metal including alloys, unwrought and partly wrought:				
value, thousands	$2,417	$9,586	$50	Italy $9,536.
Iron and steel: Metal:				
Scrap	42,720	22,699		Thailand 15,063; Pakistan 4,000; Sweden 1,688.
Pig iron, cast iron, related materials	248	602	43	Switzerland 240; Sweden 232.
Ferroalloys:				
Ferromolybdenum	13			
Ferronickel		112		All to United Kingdom.
Ferrosilicon	5,904			
Silicon metal	1			
Unspecified	363	420		Finland 390; Netherland 30.

See footnotes at end of table.

Table 2.—German Democratic Republic: Apparent exports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1985	1986[p 2]	Destinations, 1986	
			United States	Other (principal)
METALS —Continued				
Iron and steel: Metal —Continued				
Steel, primary forms thousand tons	122	141	(3)	Italy 69; Belgium-Luxembourg 32; Thailand 23.
Semimanufactures:				
Bars, rods, angles, shapes, sections do.	1,583	1,649	10	Hong Kong 76; Denmark 37; unspecified 1,366.
Universals, plates, sheets do.	847	841	46	Thailand 53; Switzerland 38.
Hoop and strip do.	588	579	—	Belgium-Luxembourg 2; Switzerland 2; unspecified 572.
Rails and accessories do.	11	11	—	NA.
Wire do.	45	63	(3)	Netherlands 4; Belgium-Luxembourg 2; unspecified 56.
Tubes, pipes, fittings do.	[4]215	[4]197	1	Yugoslavia 23; France 20; Poland 17.
Castings and forgings, rough do.	56	115	(3)	Switzerland 4; France 2; unspecified 107.
Lead:				
Oxides	836	2,104	—	Yugoslavia 1,510; Sweden 518; Denmark 41.
Metal including alloys:				
Scrap	479	88	—	All to Netherlands.
Unwrought	521	2,814	—	Netherlands 2,420; United Kingdom 394.
Semimanufactures	2	—	—	—
Magnesium: Metal including alloys, semimanufactures	—	5	—	All to France.
Manganese: Ore and concentrate, metallurgical-grade	19	—	—	—
Nickel: Metal including alloys:				
Scrap	—	67	—	All to Netherlands.
Unwrought	415	23	—	Netherlands 13; Austria 10.
Semimanufactures	37	3	—	All to Italy.
Platinum-group metals: Metals including alloys, unwrought and partly wrought value, thousands	$2,918	$85	—	All to Netherlands.
Silicon, high-purity	1	—	—	—
Silver:				
Metal including alloys, unwrought and partly wrought value, thousands	$62,245	$80,547	—	United Kingdom $80,538; Italy $9.
Tin:				
Ash and residue containing tin	—	42	—	All to Belgium-Luxembourg.
Metal including alloys, unwrought	40	29	—	Belgium-Luxembourg 24; Denmark 5.
Titanium: Oxides	21	—	—	—
Zinc:				
Ore and concentrate	2,669	6,278	—	All to Italy.
Oxides	100	1,937	—	Norway 1,914; Switzerland 23.
Metal including alloys, unwrought	143	—	—	—
Other:				
Ores and concentrates	20	—	—	—
Ashes and residues	20,340	50,002	—	All to Norway.
Base metals including alloys, all forms	6,372	2	—	Japan 1; Sweden 1.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	3	—	—	—
Artificial: Corundum	192	50	—	All to Spain.
Dust and powder of precious and semiprecious stones including diamond value, thousands	$3	—	—	—
Grinding and polishing wheels and stones	242	231	—	Italy 77; United Kingdom 42; Greece 24.
Asbestos, crude	—	6	—	All to Yugoslavia.

See footnotes at end of table.

Table 2.—German Democratic Republic: Apparent exports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1985	1986[p 2]	Destinations, 1986: United States	Destinations, 1986: Other (principal)
INDUSTRIAL MINERALS —Continued				
Barite and witherite	653	210		Belgium-Luxembourg 100; Yugoslavia 100; Sweden 10.
Boron materials: Oxides and acids		14		Finland 7; Greece 7.
Bromine	1,024	536		France 357; Hungary 179.
Cement thousand tons	[3]1,557	[3]1,855		Sweden 106; Hungary 97; unspecified 1,443.
Chalk[3]	37,730	35,268		NA.
Clays, crude:				
Kaolin	[3]148,704	[3]137,876		Yugoslavia 13,883; Hungary 11,116; unspecified 91,522.
Unspecified	18,340	11,832		Netherlands 4,689; Hungary 4,424; Sweden 2,719.
Cryolite and chiolite		38		All to Norway.
Diamond:				
Gem, not set or strung value, thousands	$206			
Industrial stones do	$39	$432		All to Belgium-Luxembourg.
Feldspar, fluorspar, related materials:				
Fluorspar	25,831	11,926		Netherlands 9,157; Sweden 1,343; Belgium-Luxembourg 1,066.
Unspecified	3,508	7,100		Norway 4,752; Yugoslavia 1,246; Austria 1,102.
Fertilizer materials: Manufactured:				
Ammonia thousand tons	226	30		Spain 29; Sweden 1.
Nitrogenous do	[3]1,421	[3]2,186	290	Canada 67; France 67; unspecified 1,631.
Phosphatic do	8	10		France 4; Netherlands 3; Switzerland 1.
Potassic, K_2O content[3] do	2,791	2,814	38	Brazil 438; Czechoslovakia 407; India 303.
Unspecified and mixed do	118	93	6	Austria 79; Italy 6.
Graphite, natural		95		All to Yugoslavia.
Gypsum and plaster	[3]105,498	[3]97,812		Mainly to Sweden.
Kyanite and related materials	20			
Lime	55			
Magnesium compounds:				
Oxides and hydroxides	2,180	3,729		Austria 2,358; Sweden 900; Netherlands 381.
Other	11,251	94,003		Denmark 43,316; France 33,656; United Kingdom 8,904.
Nitrates, crude	40	118		Yugoslavia 100; Portugal 18.
Phosphates, crude	22,620	19,000		All to Bulgaria.
Pigments, mineral: Iron oxides and hydroxides, processed	384	158		Yugoslavia 90; United Kingdom 60; Sweden 8.
Potassium salts, crude	33,017	22,391		United Kingdom 13,810; Belgium-Luxembourg 8,581.
Precious and semiprecious stones other than diamond: Natural value, thousands	$74	$14	$13	Sweden $1.
Salt and brine[3] thousand tons	1,604	1,721		Sweden 90; Finland 54; unspecified 1,512.
Sodium compounds, n.e.s.:				
Carbonate, manufactured	[3]327,100	[3]326,600		Czechoslovakia 82,000; Sweden 38,840; unspecified 128,904.
Sulfate, manufactured	18,542	3		All to Chile.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked thousand tons	29	2		Italy 1.
Worked do	29	(3)		Mainly to Norway.
Gravel and crushed rock[3] do	339	240		NA.
Limestone other than dimension do	58			
Quartz and quartzite do	3	(3)		All to Austria.
Sand other than metal-bearing do	44	35		Hungary 23; Austria 10; Yugoslavia 2.
Sand and gravel[3] do	2,246	1,893		All to West Germany.

See footnotes at end of table.

Table 2.—German Democratic Republic: Apparent exports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1985	1986[p] [2]	Destinations, 1986	
			United States	Other (principal)
INDUSTRIAL MINERALS —Continued				
Sulfur:				
Elemental:				
Crude including native and byproduct	426	—		
Colloidal, precipitated, sublimed	2	—		
Dioxide	—	27	—	All to Belgium-Luxembourg.
Sulfuric acid	[5]22,965	[5]30,815	—	Czechoslovakia 5,011; Denmark 599; unspecified 25,205.
Talc, steatite, soapstone, pyrophyllite	68	—		
Other:				
Crude	92,778	15,375	—	Norway 10,903; Hungary 2,644; Austria 1,720.
Slag and dross, not metal-bearing	47,093	27,051	—	Finland 26,494; United Kingdom 531; Denmark 26.
MINERAL FUELS AND RELATED MATERIALS				
Carbon black	3,554	2,825	—	Czechoslovakia 1,129; Yugoslavia 283; Italy 228.
Coal:				
Anthracite and bituminous thousand tons	335	337	—	Poland 314; United Kingdom 23.
Briquets of anthracite and bituminous coal do	13	3	—	Mainly to United Kingdom.
Lignite including briquets[5] do	3,313	3,485	—	West Germany 1,208; Czechoslovakia 661; Austria 384.
Coke and semicoke do	422	279	—	United Kingdom 106; Norway 55; Canada 38.
Gas, manufactured[5] million cubic feet	484	413	—	NA.
Peat including briquets and litter	2,594	45	—	Denmark 24; Austria 21.
Petroleum:				
Crude thousand 42-gallon barrels	—	[3]	—	All to Morocco.
Refinery products:				
Liquefied petroleum gas do	720	67	—	Italy 46; Austria 19; Belgium-Luxembourg 2.
Gasoline do	[5]6,178	[5]5,819	—	Sweden 326; France 20; unspecified 5,451.
Mineral jelly and wax do	90	66	—	West Germany 21; Netherlands 9; Sweden 8.
Kerosene and jet fuel do	97	122	—	Hungary 101; Sweden 20.
Distillate fuel oil do	[5]4,550	[5]5,289	—	Mainly to Sweden.
Lubricants do	[4]94	[4]42	3	Mainly to Austria.
Residual fuel oil do	[4]29,138	[4]26,813	—	Denmark 1,728; Norway 1,663; unspecified 20,148.
Bitumen and other residues do	523	1	—	Mainly to Austria.

[p]Preliminary. NA Not available.

[1]Table prepared by Jozef Plachy. Owing to a lack of official trade data published by the German Democratic Republic, this table should not be taken as a complete presentation of this country's mineral trade. Unless otherwise specified, these data have been compiled from United Nations information and data published by the trading partner countries.

[2]Totals for 1986 exclude imports by the Federal Republic of Germany.

[3]Less than 1/2 unit.

[4]Statistical Yearbook of Members of the Council for Mutual Economic Assistance, Moscow, U.S.S.R.

[5]Official Trade Statistics of the German Democratic Republic.

Table 3.—German Democratic Republic: Apparent imports of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1985	1986[p 2]	Sources, 1986: United States	Sources, 1986: Other (principal)
METALS				
Aluminum:				
Ore and concentrate	[3]208,400	[3]178,100	--	Hungary 140,460; Yugoslavia 3,716.
Oxides and hydroxides	70,677	27,822	--	Hungary 23,920; West Germany 3,869; France 24.
Ash and residue containing aluminum	--	18	--	All from United Kingdom.
Metal including alloys:				
Scrap	--	30	16	United Kingdom 14.
Unwrought	42,583	33,155	--	Yugoslavia 23,280; Hungary 8,625; France 1,013.
Semimanufactures	25,495	16,030	--	Hungary 8,286; Yugoslavia 6,981; Belgium-Luxembourg 406.
Antimony: Oxides	--	60	--	France 54; Netherlands 6.
Cadmium: Metal including alloys, all forms	38	184	--	All from Japan.
Chromium:				
Ore and concentrate, Cr_2O_3 content[3]	52,300	49,600	--	NA.
Oxides and hydroxides	34	53	--	All from United Kingdom.
Cobalt: Oxides and hydroxides	1	5	--	All from Netherlands.
Columbium and tantalum: Metal including alloys, tantalum	(4)	(4)	(4)	
Copper:				
Ore and concentrate	10,660	9,700	--	All from Morocco.
Oxides and hydroxides	--	2	--	All from Netherlands.
Ash and residue containing copper	--	51	--	All from Belgium-Luxembourg.
Metal including alloys:				
Scrap	5,851	4,027	--	Netherlands 1,406; Switzerland 1,018; Belgium-Luxembourg 962.
Unwrought	49,943	17,894	--	Chile 6,307; Poland 4,162; Belgium-Luxembourg 3,012.
Semimanufactures	13,253	1,220	1	Yugoslavia 1,054; France 59; Italy 25.
Gold: Metal including alloys, unwrought and partly wrought, value, thousands	$169	$45	--	All from Netherlands.
Iron and steel:				
Iron ore and concentrate excluding roasted pyrite, Fe content[3], thousand tons	2,681	2,598	--	U.S.S.R. 1,472; India 452; Sweden 111.
Metal:				
Scrap, do	886	986	--	U.S.S.R. 248; United Kingdom 213; France 72.
Pig iron, cast iron, related materials, do	1,103	1,158	--	Italy 30; Spain 21; unspecified 1,106.
Ferroalloys:				
Ferrochromium	321	50	--	All from Netherlands.
Ferromanganese	75,000	74,000	--	NA.
Ferromolybdenum	4	2	--	All from United Kingdom.
Ferrosilicon	77	--	--	
Silicon metal	--	1	--	All from Yugoslavia.
Unspecified	12,598	5,948	--	France 110; Belgium-Luxembourg 91; unspecified 5,741.
Steel, primary forms, thousand tons	111	107	--	Belgium-Luxembourg 20; France 5; unspecified 77.
Semimanufactures:				
Bars, rods, angles, shapes, sections, do	599	459	--	Mainly from U.S.S.R.
Universals, plates, sheets, do	3,083	3,134	--	U.S.S.R. 509; Czechoslovakia 38; unspecified 2,544.
Hoop and strip, do	152	145	--	NA.
Rails and accessories, do	180	208	--	NA.
Wire, do	28	26	--	West Germany 6; Belgium-Luxembourg 1; unspecified 17.
Tubes, pipes, fittings, do	330	306	--	Yugoslavia 25; Czechoslovakia 22; unspecified 211.
Castings and forgings, rough, do	6	9	--	Hungary 1; Yugoslavia 1; unspecified 7.

See footnotes at end of table.

Table 3.—German Democratic Republic: Apparent imports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1985	1986[p 2]	Sources, 1986: United States	Sources, 1986: Other (principal)
METALS —Continued				
Lead:				
Oxides	18	9	--	All from Netherlands.
Ash and residue containing lead	--	219	--	United Kingdom 191; Belgium-Luxembourg 28.
Metal including alloys:				
Scrap	7,307	1,849	--	Netherlands 1,355; United Kingdom 389; Denmark 105.
Unwrought	7,179	8,231	--	Sweden 7,361; Italy 852; Netherlands 18.
Magnesium: Metal including alloys, unwrought	149	111	--	Yugoslavia 86; Italy 25.
Manganese:				
Ore and concentrate, metallurgical-grade, Mn content	[3]19,500	[3]30,200	--	Mainly from U.S.S.R.
Oxides	--	3	--	United Kingdom 2; Japan 1.
Mercury 76-pound flasks	1,044	--		
Molybdenum: Ore and concentrate	31	153	--	Belgium-Luxembourg 134; Netherlands 19.
Nickel:				
Matte and speiss, Ni content	631	--		
Oxides and hydroxides	1,028	--		
Ash and residue containing nickel	330	903	--	All from Belgium-Luxembourg.
Metal including alloys:				
Unwrought	245	186	--	Finland 180; Belgium-Luxembourg 6.
Semimanufactures	132	20	--	All from United Kingdom.
Platinum-group metals: Metals including alloys, unwrought and partly wrought value, thousands	$13,290	$498	--	Italy $330; United Kingdom $167; Switzerland $1.
Silver: Metal including alloys, unwrought and partly wrought do.	$102,818	$937	$24	United Kingdom $776; Italy $105; Switzerland $29.
Tin:				
Oxides	4,313	--		
Metal including alloys, semimanufactures	59	--		
Titanium:				
Ore and concentrate	1,840	1,775	--	All from Netherlands.
Oxides	13,556	7,064	73	Yugoslavia 4,545; Finland 2,446.
Metal including alloys, all forms	--	2	--	All from Japan.
Tungsten: Ore and concentrate	114	--		
Zinc:				
Ore and concentrate	85,571	8,764	--	All from Sweden.
Oxides	110	30	--	All from France.
Blue powder	79	--		
Ash and residue containing zinc	6,810	--		
Metal including alloys:				
Scrap	206	--		
Unwrought	21,998	7,652	--	Yugoslavia 5,209; Finland 1,300; Italy 592.
Semimanufactures	1,352	231	--	Norway 223; Austria 7; Yugoslavia 1.
Zirconium: Ore and concentrate	21	77	--	All from Netherlands.
Other:				
Ores and concentrates	96	1,804	--	All from Norway.
Oxides and hydroxides	63	16	--	United Kingdom 12; Netherlands 4.
Ashes and residues	10,484	3,165	--	Finland 1,935; Italy 847; Sweden 358.
Base metals including alloys, all forms	19,935	105	1	Finland 58; Sweden 46.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc	71	5	--	All from Japan.
Artificial: Corundum	3,502	49	--	Do.
Dust and powder of precious and semi-precious stones including diamond value, thousands	$219	$21	--	Netherlands $17; Belgium-Luxembourg $4.
Grinding and polishing wheels and stones	358	226	--	Austria 206; France 8; Yugoslavia 5.
Asbestos, crude[3]	54,600	55,700	--	NA.
Barite and witherite	3,240	--		
Boron materials:				
Crude natural borates	180	--		
Oxides and acids	2,943	--		

See footnotes at end of table.

Table 3.—German Democratic Republic: Apparent imports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1985	1986[p 2]	Sources, 1986	
			United States	Other (principal)
INDUSTRIAL MINERALS —Continued				
Cement[5]	10,400	18,900	--	NA.
Chalk	633	214	--	All from France.
Clays, crude:				
Bentonite	5,267	6,232	--	All from Hungary.
Chamotte earth	123	224	--	All from Italy.
Fuller's earth	736	102	--	All from United Kingdom.
Kaolin	[3]1,400	[3]5,000	--	Czechoslovakia 1,000; United Kingdom 923; unspecified 3,077.
Unspecified	2,568	--	--	
Diamond:				
Gem, not set or strung value, thousands	$72	$120	--	All from Belgium-Luxembourg.
Industrial stones do.	$2,207	$3,099	--	Belgium-Luxembourg $2,691; United Kingdom $360; Switzerland $48.
Diatomite and other infusorial earth	1,082	1,627	--	All from France.
Feldspar, fluorspar, related materials	3,886	13,606	--	Norway 9,506; Sweden 4,100.
Fertilizer materials:				
Crude, n.e.s	10	--	--	
Manufactured:				
Ammonia	17,590	--	--	
Nitrogenous, N_2 content	[3]7,000	[3]4,600	--	NA.
Phosphatic, P_2O_5 content	6,454	[3]33,200	--	Morocco 10,944; Tunisia 4,656; unspecified 17,600.
Unspecified and mixed	4,081	66,879	--	Austria 65,000; Sweden 1,879.
Graphite, natural[3]	6,634	5,289	--	NA.
Gypsum and plaster	58	5	--	Sweden 3; Austria 2.
Magnesium compounds	56,864	11,682	--	Czechoslovakia 11,156; Austria 526.
Mica, all forms[3]	1,124	1,212	--	India 568.
Phosphates, crude, P_2O_5 content[3] thousand tons	424	437	--	U.S.S.R. 333; Jordan 43.
Pigments, mineral:				
Natural, crude	73	--	--	
Iron oxides and hydroxides, processed	21	81	--	Belgium-Luxembourg 58; Spain 23.
Precious and semiprecious stones other than diamond:				
Natural value, thousands	$60	$4	--	All from United Kingdom.
Synthetic do.	$56	--	--	
Salt and brine	10	--	--	
Sodium compounds, n.e.s.: Carbonate, manufactured	--	24	--	All from Yugoslavia.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	140	3,697	--	Hungary 2,756; Sweden 741; Italy 174.
Worked	324	275	--	All from Italy.
Gravel and crushed rock	305	293	--	Yugoslavia 266; Netherland 24; Austria 3.
Quartz and quartzite	8,411	--	--	
Sand other than metal-bearing	179	22	--	All from Italy.
Sulfur:				
Elemental, crude including native and byproduct	139,000	134,500	--	All from Poland.
Dioxide	3,981	--	--	
Sulfuric acid	[3]1,400	[3]18,500	--	Italy 6,300; unspecified 12,200.
Talc, steatite, soapstone, pyrophyllite	3,168	701	--	Austria 695; Belgium-Luxembourg 6.
Other:				
Crude	16,422	60	--	All from Austria.
Slag and dross, not metal-bearing	12,963	771	--	All from Sweden.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	584	5	--	Do.
Carbon black	44,805	28,312	--	U.S.S.R. 23,777; Sweden 2,559; France 1,550.
Coal:				
Anthracite and bituminous[3] thousand tons	5,098	7,014	--	U.S.S.R. 4,541; Czechoslovakia 784; Poland 642.
Lignite including briquets do.	203	--	--	
Coke and semicoke[3] do.	1,730	1,832	--	U.S.S.R. 991; Czechoslovakia 402; Poland 142.

See footnotes at end of table.

Table 3.—German Democratic Republic: Apparent imports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1985	1986[p 2]	Sources: 1986	
			United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS —Continued				
Gas, natural: Gaseous[3] million cubic feet	218,985	248,402	--	All from U.S.S.R.
Peat including briquets and litter	75	--		
Petroleum:				
Crude[3] thousand 42-gallon barrels	167,308	163,273	--	U.S.S.R. 125,442.
Refinery products:				
Liquefied petroleum gas do	142	--		
Gasoline do	110	85	--	Italy 58; Spain 26; Belgium-Luxembourg 1.
Mineral jelly and wax do	4	1	--	Mainly from Italy.
Kerosene and jet fuel do	59	3	--	All from Yugoslavia.
Distillate fuel oil do	538	(4)	--	Mainly from Sweden.
Lubricants[5] do	139	229	--	NA.
Residual fuel oil[5] do	167	170	--	NA.
Bitumen and other residues do	75	29	--	Yugoslavia 28.
Bituminous mixtures do	(4)	(4)	--	All from Sweden.
Petroleum coke do	146	--		
Unspecified do	6	--		

[p]Preliminary. NA Not available.

[1]Table prepared by Jozef Plachy. Owing to a lack of official trade data published by the German Democratic Republic, this table should not be taken as a complete presentation of this country's mineral trade. Unless otherwise specified, these data have been compiled from United Nations information and data published by the trading partner countries.

[2]Totals for 1986 exclude exports by the Federal Republic of Germany.

[3]Official Trade Statistics of the German Democratic Republic.

[4]Less than 1/2 unit.

[5]Statistical Yearbook of Members of the Council for Mutual Economic Assistance, Moscow, U.S.S.R.

COMMODITY REVIEW

The GDR mined small quantities of copper, iron, nickel, silver, tin, and uranium. Although metal mining in the GDR dates back to the Middle Ages, imports of concentrates, scrap, and finished metals have replaced the dwindling domestic reserves. The mining of industrial minerals and coal was more extensive, especially of lignite, potash, and rock salt, much of which was exported. Virtually all minerals, or 93% in 1983, were extracted by surface mining methods, 57.6% of which was lignite and 35.2% was building and various silicate materials.[8]

METALS

Aluminum.—Ore and concentrate were imported mostly from Hungary and Yugoslavia for domestic processing. The GDR published official production statistics for metallurgical-grade alumina only, although primary aluminum metal production was listed occasionally in national economic plans; it was 68,264 tons for 1986.[9] Almost one-half of the country's metal requirement was imported, mostly from Hungary and Yugoslavia. About 30% of the metal was exported, mostly to FRG. There were two operating aluminum smelters and one aluminum metal products plant.

Copper.—Copper-bearing shale was mined from two localities in the southeastern foothills of the Harz Mountains, the Sangerhausen ore district. Mining was underground at depths of 900 to 2,900 feet. Mining of copper shales around Mansfeld ceased in 1968. Reportedly, a 2,300-foot-deep ventilation shaft was sunk at Mansfeld, northeast of Sangerhausen. It was a part of the VEB Mansfeld Kombinat Wilhelm Pieck mine development program. Copper ore production was not reported by the GDR, but the 1987 national economic plan listed production at simply 48,000 tons, most likely a gross weight concentrate of perhaps 25% copper content.[10] Domestic mining continued to decline, and most of the metal production was based on imported materials and the recovery of scrap,

which was imported from various sources. The U.S.S.R. supplied the GDR with cathodes.

Iron and Steel.—The iron and steel industry was the mainstay of the GDR's heavy industry, ranking 20th in world production, just below the Republic of South Africa. The production continued to rise virtually uninterrupted from 3,207 tons in 1959 to its record level in 1987. This was not a small accomplishment because the Soviet Union supplied most of the iron ore requirements from the Krivoi Rog surface operations hundreds of miles away in the Ukraine. For all practical purposes, domestic extraction of iron ore ceased in 1970 because of unprofitability.

Three complexes, VEB Qualitats-und Edel-Stahlkombinat in Brandenburg, VEB Bandstahlkombinat "Hermann Mattern" (BHM) in Eisenhuttenstadt, and VEB Rohrkombinat Riesa in Riesa, produced raw steel in six steel works. A number of modernization and expansion projects were planned for startup in the new 5-year plan that starts in 1991. A new hot-strip mill at VEB Eisenhuttenkombinat Ost (EKO) of BHM was the major new project. EKO had no hot-rolling capacity. Slabs from the work's LD converter shop, built by Austria's Voestz-Alpine AG, were rolled at other works in the GDR, and in FRG, with hot coil returning to EKO for cold rolling. The U.S.S.R. was to assume the overall direction of the project, with some participation from FRG, Japan, and the United Kingdom.[11]

Lead and Zinc.—The GDR relied totally on imports for its lead and zinc requirements. Mining ceased in about 1978 due to poor grade and ore depletion. The larger refinery and two smelters were in Freiberg, and they were managed by the VEB Buntmetall lead-zinc-silver complex. The GDR's lead and zinc metal production was not reported, but the 1987 national economic plan listed 21,100 tons of zinc for the first time in many years, without any further clarification.

Nickel.—Mining of low-grade ore continued at small quantities. All production was from two small surface mines near St. Egidien in the southeast. Production statistics continued to be withheld. There were three operating smelters whose output was based mostly on imported materials.

Silver.—The mining of silver in the vicinity of Freiberg was over 800 years old in 1986.[12] It started in the Old Elizabeth Mine in 1168 and by some accounts ceased in 1969 because of unprofitability.[13] In addition to silver, lead and tin were also mined. The ore was extracted from thin veins, 15 to 30 centimeters in width, with 30° dips, and steeply dipping 2-meter-thick veins. The GDR also recycled metal scrap for the production of silver.

Tin.—Tin ore was mined at Altenberg and Ehrenfriedersdorf in the Erzgebirge area along the southeastern border, by VEB Bergbau-und Huttenkombinat Albert Funk. A stockwork was mined at Altenberg, whose center collapsed because of older underground workings. The mine was opened in 1440 to the depth of 150 meters, and was mining at a depth of 250 meters in the late 1980's. The ore was also extracted at the surface. The coarse-grained ore was beneficiated by gravity separation and the fine-grained by flotation methods. At Ehrenfriedersdorf, the ore was mined from steeply dipping 5-meter-thick beds at about 300-meter depths and beneficiated by gravity separation methods.[14] The production of tin was not reported in official statistics, but was listed as 2,400 tons in the 1986 national economic plan.[15]

INDUSTRIAL MATERIALS

Barite and Fluorspar.—All mining was underground from 0.5- to 3-meter-thick veins at 500-meter depths in the Harz Mountains and the Thuringian Forest areas in the southwestern part of the country. Barite was concentrated by flotation at the Lengenfeld plant. Reportedly, a new flotation method using new reagents was developed for alluvial spar concentration. The work was done by the Mining Academy of Freiberg in Karl-Marx-Stad, in cooperation with the VEB Kombinat Kali at Sonderhausen.

Clays (Kaolin).—Most of the GDR's kaolin deposits were in the southeastern part of the country, between Leipzig and Dresden. The largest deposits were at Brachwitz, Bortewitz, Caminau, Kemmlitz, Pommlitz, Querbitzsch, and Seilitz. VEB Vereinigte Kemmlitzer Kaolinwerke, the major producer, managed about 15 surface mines.

The ore grade continued to decline, requiring more overburden to be removed and stacked, resulting in higher costs and less production. The kaolin was used primarily by the ceramics industry.

Magnesium.—All of the GDR's magnesium was produced from magnesium-rich brines as a byproduct of potash mining and processing. VEB Kombinat Kali managed one plant at Sonderhausen and another at Teutschendal, at a combined approximate

capacity of 30,000 tons per year.[16]

Potash.—Potash was one of the few commodities that continued its steady expansion. After the U.S.S.R. and Canada, the GDR was the third largest producer, with about 12% of world output. It was also the third largest exporter of the material, after Canada and the U.S.S.R., and shipped about 17% of world exports. Kali Bergbau handled all foreign transactions for its parent company VEB Kombinat Kali. The Kombinat expanded its compaction and packing plant in 1980, so that about 24% of its potash was exported in granular form. The port of Wismar on the Baltic Sea was the main loading facility. Almost all of the potash produced was used as fertilizer by the domestic agriculture industry. Reportedly, Kalibetrieb Werra at Merkers improved its operation, which resulted in an additional 20,000 tons of material. The improved method was a crystallization process that reused effluent, which contained potash salts in solution from the operating potash plant.[17]

Salt.—The production of marine salt has remained more or less the same for the past 10 years and was officially reported. The mining of rock salt increased steadily, although not significantly, and production was not reported. Most of the rock salt came from the Bernburg underground mine; some of the salt was also extracted by solution mining from brines.

MINERAL FUELS

Lignite continued to contribute significantly to the GDR's economy, remaining its most important mining activity. The GDR also maintained its role as the world's largest producer of lignite. All mining was by surface methods; underground mining of anthracite ceased in 1978 because of complex geologic conditions. There were from 35 to 40 open pit mines, ranging from 100 to 200 feet in depth. Two new surface mines were reportedly put on-stream in 1987. Mining technology was inadequate for deeper mining and the quality of coal also decreased, especially the salt content. The high moisture content, at about 70%, may have caused a drop in lignite production during the severe 1986-87 winter because of freezing conditions. The demand for energy was still rising and energy conservation measures were in effect to counteract the difficult mining conditions and high cost of operations. Lignite reserves were estimated to last well into the next century, therefore remaining the GDR's only dependable domestic source of energy.

Although exploration for natural gas continued, this fuel constituted a small percentage of the available energy. Nuclear power also was an insignificant contributor of electricity, with only one plant operating. The GDR continued to rely on the U.S.S.R. for crude oil requirements.

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[1]Physical scientist, Division of International Minerals.

[2]CMEA is an organization of the following 10 centrally planned economy countries involved in economic cooperation and coordination: Bulgaria, Cuba, Czechoslovakia, the German Democratic Republic, Hungary, Mongolia, Poland, Romania, the U.S.S.R., and Vietnam. Yugoslavia has permanent observer status.

[3]The GDR mark (M) is not convertible, and the official exchange rate cannot be used as a measure of relative value. Foreign trade figures, however, are denoted in valuta marks (VM), which are convertible. The rate of valuta marks converted to U.S. dollars in 1987 was taken as VM1.82 = US$1.00.

[4]Donovan, B. Honecker's Policy of Small Steps. Radio Free Europe Research, RAO Background Report 23 (German Democratic Republic), Feb. 17, 1988, p. 2.

[5]Neues Deutschland (East Berlin), Jan. 23-24, 1988, pp. 3-6.

[6]Staatlichen Zentralverwalturg fur Statistik. Statistisches Jahrbuch 1987, der Deutschen Demokratischen Republik. Staatsverlag (East Berlin), 1987.

[7]Work cited in footnote 5.

[8]Strzodka, K. Der Bergbau der GDR und seine Folgelandschaft. Neue Bergbautechnik (Leipzig), No. 6, June 1987, p. 201.

[9]Neues Deutschland (East Berlin), Nov. 30-Dec. 2, 1985.

[10]———. Nov. 28, 1987, pp. 14-15.

[11]Metal Bulletin (London), Mar. 24, 1987, p. 19.

[12]Arnold, W. 800 Jahre Bergstadt Freiberg. Neue Bergbautechnik (Freiberg), No. 7, July 1986, pp. 247-251.

[13]Kozlovsky, E. A. (ed.). Gornaya entsiklopediya (Mining Encyclopedia). Sovetskaya entsiklopediya (Moscow), 1986, v. 2, p. 28.

[14]Work cited in footnote 13.

[15]Work cited in footnote 9.

[16]Coope, B. The World Magnesia Industry. Ind. Miner. (London), Feb. 1987, pp. 28-30.

[17]Mining Journal (London), Nov. 13, 1987, pp. 391-392.

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